

AMENDMENTS TO THE CLAIMS

Please amend claims 3, 6, 27 and 36 by this amendment as follows and newly add claims 38 through 50 by this amendment as follows:

1 Claims 1-2. (Canceled)

1 3. (Currently Amended) An ink-jet printhead, comprising:

2 a substrate being a single integrated monolithic and homogenous unit of silicon, said
3 substrate, having a rear surface, said rear surface having a channel having a predetermined depth,
4 wherein a plurality of ink feed holes are formed on a bottom of the channel perforating said
5 substrate;

6 a nozzle plate coupled to a front surface of the substrate, said nozzle plate being
7 perforated by a plurality of chamber-orifice complex holes, wherein each chamber-orifice
8 complex hole corresponds to at least one of said plurality ink feed holes, the nozzle plate
9 comprising polyimide and not comprising any metal; and

10 a plurality of heaters disposed on the front surface of the substrate, each one of said
11 plurality of heaters being located near corresponding ones of said plurality of chamber-orifice
12 complex holes, wherein each one of said plurality of ink feed holes is formed at a center portion
13 of a corresponding one of said plurality of chamber-orifice complex holes, and each one of said
14 plurality of said heaters surrounds corresponding ones of said plurality of ink feed holes, wherein
15 each one of said plurality of heaters is of an omega shape that surrounds said corresponding ink

16 feed hole.

1 Claims 4-5. (Canceled)

1 6. (Currently Amended) An ink-jet printhead, comprising:

2 a substrate being a single integrated monolithic and homogenous unit of silicon, said
3 substrate, having a rear surface, said rear surface having a channel having a predetermined depth,
4 wherein a plurality of ink feed holes are formed on a bottom of the channel perforating said
5 substrate;

6 a nozzle plate comprised of polyimide and coupled to a front surface of the substrate, said
7 nozzle plate being perforated by a plurality of chamber-orifice complex holes, wherein each
8 chamber-orifice complex hole corresponds to at least one of said plurality ink feed holes; and

9 a plurality of heaters disposed on the front surface of the substrate, each one of said
10 plurality of heaters being located near corresponding ones of said plurality of chamber-orifice
11 complex holes, wherein each one of said plurality of ink feed holes is formed at a center portion
12 of a corresponding one of said plurality of chamber-orifice complex holes, and each one of said
13 plurality of said heaters surrounds corresponding ones of said plurality of ink feed holes, wherein
14 each chamber-orifice has a ~~truncated~~ conical shape portion and a cylindrical portion, wherein a
15 lower end of said chamber orifice facing said substrate faces the corresponding ink feed hole and
16 heater formed on the substrate and the other end having a smaller diameter faces toward an
17 outside of said ink-jet printhead.

1 Claims 7-26. (Canceled)

1 27. (Currently Amended) An ink-jet printhead, comprising:

2 a substrate being a single integrated monolithic and homogenous unit of silicon, said
3 substrate, having a rear surface, said rear surface having a channel having a predetermined depth,
4 wherein a plurality of ink feed holes are formed on a bottom of the channel perforating said
5 substrate;

6 a nozzle plate coupled to a front surface of the substrate, said nozzle plate being
7 perforated by a plurality of chamber-orifice complex holes, wherein each chamber-orifice
8 complex hole corresponds to at least one of said plurality of ink feed holes; and

9 a plurality of heaters disposed on the front surface of the substrate, each one of said
10 plurality of heaters being located near corresponding ones of said plurality of chamber-orifice
11 complex holes, said nozzle plate being a single integrated monolithic and homogenous unit, each
12 chamber-orifice hole having a cylindrical shaped portion on a portion of said chamber-orifice
13 hole closest to a side of said nozzle plate that attaches to said substrate and a conical shaped
14 portion on a portion of said chamber-orifice hole closest to a side of said nozzle plate opposite
15 from where said nozzle plate attaches to said front surface of said substrate, said conical shaped
16 portion being a section of a right circular cone with an axis perpendicular to said front surface of
17 said substrate and perpendicular to said surfaces of said nozzle plate, said cylindrical shaped
18 portion of said chamber-orifice hole having a height that is greater than twice the thickness of the

19 heaters, a disk shaped portion being arranged between the cylindrical shaped portion and the
20 conical shaped portion, the disk shaped portion of the nozzle plate being parallel to the substrate.

1 Claims 28-35. (Canceled)

1 36. (Currently Amended) An ink-jet printhead, comprising:

2 a substrate being a single integrated monolithic and homogenous unit of silicon, said
3 substrate, having a rear surface, said rear surface having a channel having a predetermined depth,
4 wherein a plurality of ink feed holes are formed on a bottom of the channel perforating said
5 substrate;

6 a nozzle plate coupled to a front surface of the substrate, said nozzle plate being
7 perforated by a plurality of chamber-orifice complex holes, wherein each chamber-orifice
8 complex hole corresponds to at least one of said plurality ink feed holes; and

9 a plurality of heaters disposed on the front surface of the substrate, each one of said
10 plurality of heaters being located near corresponding ones of said plurality of chamber-orifice
11 complex holes, wherein each one of said plurality of ink feed holes is formed at a center portion
12 of a corresponding one of said plurality of chamber-orifice complex holes, and each one of said
13 plurality of said heaters surrounds corresponding ones of said plurality of ink feed holes, said
14 nozzle plate being a single integrated monolithic and homogenous unit, each chamber-orifice
15 hole having a cylindrical shaped portion on a portion of said chamber-orifice hole closest to a
16 side of said nozzle plate that attaches to said substrate and a conical shaped portion on a portion

17 of said chamber-orifice hole closest to a side of said nozzle plate opposite from where said
18 nozzle plate attaches to said front surface of said substrate, a disk shaped connector portion
19 between the cylindrical shaped portion to the conical shaped portion and connecting the
20 cylindrical shaped portion to the conical shaped portion, all portions of said conical shaped
21 portion having a smaller diameter than the cylindrical shaped portion.

1 37. (Previously Amended) The ink-jet printhead of claim 36, said cylindrical shaped
2 portion of each chamber-orifice hole having an axis that is perpendicular to said front surface of
3 said substrate and perpendicular to surfaces of said nozzle plate.

1 38. (New) The ink-jet printhead of claim 3, the channel being V-shaped.

1 39. (New) The ink-jet printhead of claim 27, the nozzle plate comprising polyimide.

1 40. (New) The ink-jet printhead of claim 27, the channel being V-shaped.

1 41. (New) The ink-jet printhead of claim 36, the nozzle plate comprising polyimide.

1 42. (New) The ink-jet printhead of claim 36, the channel being V-shaped.

1 43. (New) The ink-jet printhead of claim 36, said cylindrical portion of said chamber-

2 orifice hole having a height that is greater than twice a thickness of the heaters.

1 44. (New) The ink-jet printhead of claim 36, said cylindrical portion of said chamber-
2 orifice hole being substantially taller than the heaters.

1 45. (New) The ink-jet printhead of claim 36, said heaters having a thickness that is a
2 small fraction of a height of the cylindrical shaped portions of the chamber-orifice holes.

1 46. (New) The ink-jet printhead of claim 6, said nozzle plate being absent of a metal.

1 47. (New) The ink-jet printhead of claim 36, said nozzle plate being absent of a metal.

1 48. (New) The ink-jet printhead of claim 27, wherein there is a one-to-one
2 correspondence between the chamber-orifice complex holes and the ink feed holes.

1 49. (New) The ink-jet printhead of claim 36, the disk shaped connector being a surface
2 that is parallel to the substrate, a width of the disk shaped connector being equal to a difference in
3 radii between the cylindrical shaped portion and a bottom of the conical shaped portion.

1 50. (New) The ink-jet printhead of claim 27, the disk shaped portion having a width
2 equal to a difference in radii between the cylindrical shaped portion and a maximum width of the

3 conical shaped portion.